

# ELEOCHARIS MUTATA (CYPERACEAE) NEW TO THE FLORA OF NORTH AMERICA NORTH OF MÉXICO

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## ABSTRACT

*Eleocharis mutata* (L.) Roem. & Schult. is reported new to the flora of North America north of México based on recent collections from Brazoria Co., Texas, U.S.A. A key to separate *E. mutata* from other species of *Eleocharis* subg. *Limnochloa* in North America north of México as well as a technical description and ecological notes are provided.

## RESUMEN

Se cita *Eleocharis mutata* (L.) Roem. & Schult. Nueva para la flora de Norte América al norte de México en base a recientes colecciones de Brazoria Co., Texas, U.S.A. Se ofrece una clave para separar *E. mutata* de otras especies de *Eleocharis* subg. *Limnochloa* en Norte América al norte de México así como una descripción técnica y notas ecológicas.

Recent field work in Texas produced collections of a member of *Eleocharis* R. Br. subg. *Limnochloa* (P. Beauv. ex T. Lestib.) Torr. (= *Eleocharis* ser. *Mutatae* Svenson) with triquetrous culms. These specimens keyed to *E. fistulosa* Schult. (= *E. acutangula* [Roxb.] Schult.) in *Manual of the Vascular Plants of Texas* (Correll & Johnston 1970) and *Aquatic and Wetland Plants of Southwestern United States* (Correll & Correll 1975). Correll and Johnston (1970) report *E. fistulosa* from the Rio Grande plains of Texas without mentioning any specific county. González-Elizondo et al. (2002) discussed the misapplication of *E. fistulosa* in North America, referring to Texas specimens as *E. obtusetrigona* (Lindl. & Nees) Steud. A review of pertinent manuals and treatments of subg. *Limnochloa* (Svenson 1929; Adams 1972; Hooper 1972; Kern 1974; Haines & Lye 1983; Koyama 1985; Wilson 1993; González-Elizondo 1994; Browning et al. 1997; González-Elizondo et al. 2002) and a critical examination of numerous herbarium specimens confirm our collections are of *Eleocharis mutata* (L.) Roem. & Schult.

*Eleocharis* subg. *Limnochloa* comprises over 20 species of perennial, rhizomatous, aquatic herbs distributed in tropical, subtropical, and warm temperate areas worldwide, and recognized by indurate and prominently to obscurely longitudinally many-veined scales and cylindrical spikelets (González-Elizondo & Peterson 1997; González-Elizondo 2002). Despite the usually coarse and conspicuous habit of this group, new species have recently been described from Venezuela (González-Elizondo & Reznicek 1996) and

México (Roalson 1999). *Eleocharis mutata* has not been previously reported for Texas (Hatch et al. 1990; Jones et al. 1997). In *Flora of North America*, González-Elizondo (2002) reports six species belonging to subg. *Limnochloa*: *E. cellulosa* Torr., *E. elongata* Chapm., *E. equisetoides* (Elliott) Torr., *E. interstincta* (Vahl) Roem. & Schult., *E. obtusetrigona* (Lindl. & Nees) Steud., *E. quadrangulata* (Michx.) Roem. & Schult., and *E. robbinsii* Oakes. A dichotomous key modified from Svenson (1929) and González-Elizondo (2002) and a technical description of *E. mutata* follow.

KEY TO *ELEOCHARIS* SUBG. *LIMNOCHLOA* IN NORTH AMERICA,  
NORTH OF MÉXICO

1. Culms without septa.
  2. Culms triquetrous to terete, not distinctly quadrangular.
    3. Culms relatively coarse, (2-)3-5(-8.5) mm thick at leaf sheath summit; spikelets 3.5-8 mm thick; achene 1.4-1.8 mm wide.
      4. Culms triquetrous (rarely distally obscurely 3 angled); achene apex slightly constricted at the summit into a hard annular thickening (see Fig. 1d); perianth bristles irregularly retrorsely spinulose \_\_\_\_\_ ***Eleocharis mutata***
      4. Culms more or less terete or distally obscurely 3-5 angled, never triquetrous; achene apex gradually to markedly constricted, but without hard annular thickening; perianth bristles smooth to coarsely retrorsely spinulose.
        5. Achene apex gradually narrowed into a stout spongy region; perianth bristles usually smooth or sometimes finely retrorsely spinulose (see Fig. 1e) \_\_\_\_\_ ***Eleocharis cellulosa***
        5. Achene apex markedly constricted to a short neck; perianth bristles coarsely retrorsely spinulose \_\_\_\_\_ ***Eleocharis obtusetrigona***
    3. Culms slender, 0.5-1.5 mm thick above leaf sheath summit; spikelets 3 mm or less thick; achene 0.5-1.4 mm wide.
      6. Achene 0.65-1.4 long  $\times$  0.5-0.8 wide; floral scales 3.5-4.5 mm long; tubers absent \_\_\_\_\_ ***Eleocharis elongata***
      6. Achene 1.9-2.6 long  $\times$  1-1.4 mm wide; floral scales 5-7.8 mm long; tubers sometimes present \_\_\_\_\_ ***Eleocharis robbinsii***
  2. Culms distinctly quadrangular (4-angled) \_\_\_\_\_ ***Eleocharis quadrangulata***
1. Culms septate.
  7. Perianth bristles longer than the achene, coarsely retrorsely spinulose; achenes conspicuously sculptured at 10-15 $\times$ ; culm septa extending up the culm to immediately below spikelet \_\_\_\_\_ ***Eleocharis interstincta***
  7. Perianth bristles much shorter than the achene, thin and soft, without teeth; achenes not conspicuously sculptured at 10-15 $\times$ , appearing nearly smooth; culm septa extending up the culm to well short of spikelet \_\_\_\_\_ ***Eleocharis equisetoides***

***Eleocharis mutata* (L.) Roem. & Schult. (Fig. 1 a-d).** *Scirpus mutatus* L., Syst. Nat. (ed. 10) 2:867.1759. *Eleocharis mutata* (L.) Roem. & Schult., Sys. Veg. 2:155.1817. *Limnochloa mutata* (L.) Nees, Fl. Bras. 2(1):101.1842. TYPE: JAMAICA. (LECTOTYPE, typified by Browning et al. [1997]: LINN photo).

*Eleocharis scariosa* Steud., Syn. Pl. Glumac. 80. 1855. TYPE: BRASIL: Martius Herb. Fl. Bras. 229 (ISOTYPES: GH, M, NY).

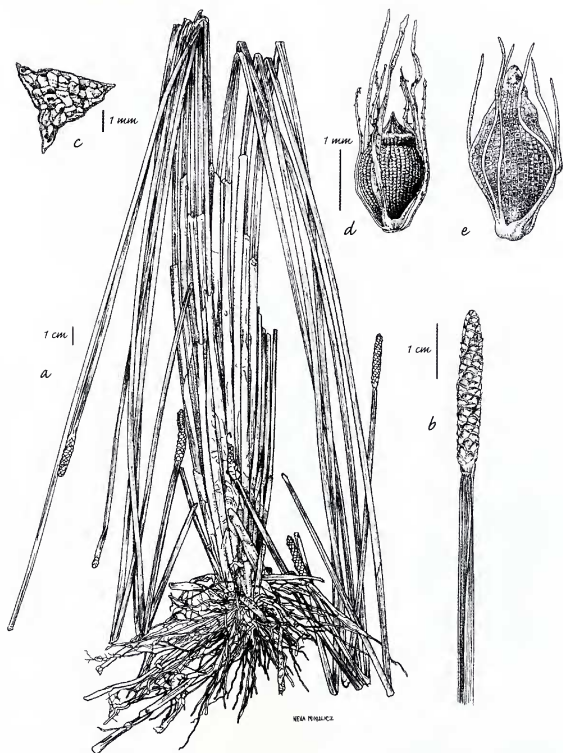


FIG. 1. *Eleocharis mutata* (L.) Roem. & Schult. a. Habit. b. Detail of spikelet and distal end of culm. c. Cross section at distal end of culm. d. Detail of achene. *Eleocharis cellulosa* Torr. e. Detail of achene. a-d drawn from Rosen 2674 (MICH) and e drawn from Rosen 2698 (SBSC) by Neva Mikulicz.

**Plants** perennial, rhizomes long, 2-5 mm thick, scales to 8 mm, tubers absent; roots coarse fibrous, gray-brown to maroon. **Culms** triquetrous, usually conspicuously so distally (rarely in the field Texas plants on dryer sites obscurely 3 angled), sometimes twisted, (31-)53.8-93(-116) cm  $\times$  (2.2-)2.6-5.1(-8.5) mm, soft to hard, internally spongy, with incomplete transverse septa, longitudinally striate when dry, shinny and smooth when fresh, dark green. **Leaf sheaths** 2, apically notched, apex acute to acuminate, membranous, loose, friable, maroon-chestnut to cinnamon brown; blade reduced to a mucro to 5 mm long. **Spikelets** cylindrical, obtuse (acute), proximal 2-3 scales empty, the first amplexicaul and appearing as a continuation of the culm, (12-)23-44(-66)  $\times$  (3-)3.8-5.4(-8) mm; floral scales appressed to weakly spreading upon drying, ovate to broadly ovate, apex broadly rounded, the distal 0.2-0.3 mm hyaline-erose, central area broadly keeled from base for ca. 1/3-1/2 scale length, (2.8-)3.2-4(-4.8)  $\times$  (1.9-)2.5-3.4(-4.8) mm, finely many veined, mid-vein evident only in adaxial view, cartilaginous, stramineous, abaxially red-maculate or more frequently with a dark band near apex, adaxially red-maculate. **Flowers** with (5-)6-8 perianth bristles, irregularly oriented, narrow to somewhat broad and strap-shaped proximally, irregularly retrorsely spinulose nearly to the base, mostly exceeding the achene, stramineous, the margins and spinules sometimes dark reddish; stamens 3; anthers 1.3-2.0 mm, reddish-brown; style trifid. **Achene** biconvex, more or less obpyriform, obovate, or sometimes broadly elliptic, the apex constricted to about 0.6 the width of the achene, broadening again into a hard annulus of the same texture and color as the achene, (1.2-)1.3-1.6(-1.9) mm (not including annulus or tubercle)  $\times$  (1-)1.1-1.4(-1.8) mm, with ca. 20 longitudinal rows of deeply pitted horizontally rectangular cells visible through transparent periclinal layer on each achene face, dull, cream colored, maturing to lustrous olive-yellow (amber); annulus oblong or tapering apically, (0.05-)0.09-0.18(-0.3) mm high; tubercle dorsoventrally compressed, triangular, well formed to withered, distinct or sometimes appearing to merge with the annulus or shouldered by it, (0.15-)0.3-0.5(-0.9) mm  $\times$  0.4-0.8 mm, dark brown.

**Phenology and Ecology.**—In Texas, flowering from early June through early November. *Eleocharis mutata* forms large monotypic colonies in dark gray, clay-loam soils of a shallow, semi-permanently flooded freshwater marsh near the coast, associated in the dryer fringes of the marsh with *Cyperus elegans* L., *C. oxylepis* Steud., *C. polystachyos* Rottb., *Eleocharis cellulosa*, *E. olivacea* Torr., *E. quadrangulata*, *Juncus roemerianus* G. Scheele, *Paspalum floridanum* Michx. P. *vaginatum* Sw., and *Spartina patens* (Ait.) Muhl. (Fig. 2). The nativity of *Eleocharis mutata* in Texas is uncertain; as we encountered it in Brazoria County, it was ecologically dominant, forming pure stands in a habitat usually more diverse.

**Distribution.**—In North America north of México, currently known from Brazoria County, Texas, on the eastern edge of the Gulf Prairies and Marshes.



FIG. 2. Fresh marsh in late August 2003 at Hoskins Mound near the Brazoria National Wildlife Refuge in Brazoria County, Texas, with *Eleocharis mutata* (L.) Roem. & Schult. in foreground.

Expected also in similar habitat from Jefferson County, SW to Goliad County, S through the Rio Grande Valley. There is an immature specimen at TAES with triquetrous culms (*Glazener s.n.*, collected 16 miles W of Goliad in 1941) annotated as *Eleocharis acutangula*. Unlike *E. acutangula*, however, this specimen has broadly ovate, finely many veined floral scales which fits our concept of *E. mutata*. It is possible that *E. mutata* is more widespread in southern Texas, and has been overlooked because of its affinity for aquatic habitats and its superficial similarity to *E. cellulosa* and *E. quadrangulata* with which it occurs. Coastal habitats in United States, México, Belize, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Cuba, Jamaica, Haiti, Dominican Republic, throughout the West Indies, tropical South America, and tropical Africa.

*Vernacular name.*—**scallion grass** (Adams 1972).

Representative specimens examined: **NORTH AMERICA. U.S.A.. TEXAS. Brazoria Co.:** Hoskin's Mound within the Brazoria National Wildlife Refuge, 3.8 km SE of the intersection of FM 2004 and Co. Rd 277, locally abundant in shallow water along roadside ditch and marsh S of perimeter oil-field service road, N of the mound, 21 Oct 2002, *Rosen & Jones* 2382 (MO, TAES, TEX, VSC), 29 Aug 2003, *Rosen* 2606 (GH, SBSC, NY, US, WIS, Z), *Rosen* 2614 (CIIDIR, K, MICH). **Goliad Co.:** 16 mi. W of Goliad, in water, 23 Aug 1941, *Glazener s.n.*, (TAES). **BARBADOS. Christ Church:** Gruene Hill Swamp, domi-

nant understory herb, forming a lawn throughout much of the swamp, 09 Nov 1996, *Rogers 96-128* (MICH) **BELIZE**. **Belize District**: roadside through mangrove swamp, 11 Mar 1933, *Lundell 1816* (MICH); Belize City, vacant lots, roadsides, disturbed sites about town, 1 m elev., swamp on S side of town, 09 Aug 1992, *Worthington 21439* (MO). **COSTA RICA**. **Limon**: Limon airport, beach at mouth of Rio Banano, near sand dunes and shallow ponds 35 m from shore, 07 Jul 1966, *Denton 1139a* (MICH). **Guanacasta**: Palo Verde National Park, swamp ca. 2 km from park headquarters at Catalina, along transect to Laguna Nicaragua, abundant, 07 Sep 1984, *Crow & Rivera 5981* (MO). **DOMINICAN REPUBLIC**. **Prov. Maria**: Llanura de Nagua, Trinidad Sanchez, Las Gordas, 18.7 km, Llanuras plantadas de arroz, zona pantanosa, con muchas malezas despues de la ultima cosecha (en el camino de Las Gordas a Mata Bonita), 19°25'N, 70°00'W, 05 Oct 1982, *Mejia & Pimentel 23601* (MO). **Prov. Peravia**: very common in muddy sites at roadside, Galeon, Bani, 29 Oct 1976, *Cicero 8276* (NY, TAES). **HAITI**: shallow pond and swamp area between Terrier Rouge and Fort Libertr, northeastern alluvial plain, 26 Jun 1941, *Bartlett 17480* (MICH, NY, US). **HONDURAS**. **Atlantida**: in boggy area near the seashore, vicinity of Ceiba, 06 Jul 1938, *Yunker et al.* 8243 (MICH, NY); Sibun River, 28 Nov 1934, *Gentle 1429* (MICH, NY); Hector Creek, Sibun River, 28 Nov 1934, *Gentle 1432* (K, MICH, NY, US). **Toledo**: in wet area on river bank, Monkey River, 18 Oct 1941, *Gentle 3708* (MICH, NY, US); Monte Redondo lake, vicinity of Yeguaré river, El Eamorano, 23 Jan 1970, *Molina 25403* (MO, NY); commonly found along the edge of brackish lagoons also thrives where it receives continuous sea spray, All Pines, 23 Jan 1970, *Schipp 786* (MICH, NY, Z). **JAMAICA**. St. Thomas, just N of Grant Pen, off of road A-4, a little above sea level, at edge of and growing in open water at roadside, 21 Jul 1963, *Crosby et al.* 822 (MICH, NY, US); Port Antonio, Dec 1890, *Hitchcock s.n.* (MO). **MEXICO**. **Jalisco**: about 2 km N of Puerto Vallarta in cultivated areas west of the airport, near sea level, very common in wet depressions beside road, 13 Nov 1963, *Feddema 2533* (MICH); La Huerta, Rancho Cuixmala, Gargollo farm, on E side of Cerro de la Alborada, Lat. 19°24'N, Long. 104°59'W, elev. below 50 m, highly disturbed remnants of tropical semi-deciduous forest now used for cattle, locally common perennial with feet in water, mostly emergent, some plants recently exposed and in mud, 04 Nov 1991, *Lott et al.* 4116 (K, MICH, NY, WIS); 3 km al N de Puerto Vallarta, sobre el camino al aeropuerto, terrenos planos, salobres, en suelo humedo, escaso, 16 Nov 1963, *Rzedowski 17829* (MICH). **Yucatan**: pequeña zona inundada a 8 kms al SE de Sisal, 11 Aug 1978, Lot 2582 (MO). **Montserrat**: dominant sedge in center of Chance's pond, alt. 2700 ft, 14-18 Jun 1950, *Howard 11894* (MICH). **NICARAGUA**. **Zelaya**: in wet sand, El Bluff near Bluefields, 14 Dec 1968, *Seymour 642* (BRIT); dense stands covering many acres, brackish inlet, Corn Island, 06 Mar 1971, *Svenson 4317* (BRIT). **Managua**: near the mouth of Rio El Carmen, 30 km NW of Masachapa, freshwater marsh 1 km from shore, 16 Nov 1976, *Neill 1276* (MO). **PANAMA**. **San Blas**: Comarca de San Blas, Rio Urgandi (Rio Sidra), elev. 0-30 m, in marsh by airport, 27 Jun 1986, *de Nevers & Herrera 8105* (MO). **Canal Zone**: Farfan Beach road, growing in water, 03 Aug 1967, *Kirkbride & Elias 69* (MO, NY). **Bocas del Toro**: out along road W Almirante, 17 Oct 1965, *Blum 1415* (MO). **PUERTO RICO**: 1.3 mi S on Rte 687 from junction with Rte 686, elev. 10 m, E end of Laguna Tortuguero, sandy soil in marsh, 31 Dec 1980, *Solomon 5749* (MO); Yabucoa, su paludosis justa flumen guayjanes, 10 Feb 1886, *Sintenis 4942* (GH, NY, Z-2 sheets, ZT).

**SOUTH AMERICA**. **BRAZIL**. **Ceara**: brackish marshes, Barra do Ceara, municipio de Fortaleza, 25 Sep 1935, *Drouet 2503* (MICH, NY). **COLOMBIA**. **Antioquia**: swampy area on the peninsula approx. 1 km W of Turbo, probable lat. ca. 8° 5' N, long ca. 76° 43' W, elevation sea level, common growing in mud at edge of brackish slough in sun, 31 Mar 1962, *Feddema 2111* (MICH); Santa Marta, 100 ft, Sep 1898-1901, *Smith 245* (MICH, NY). **ECUADOR**. **Costa**: Prov Esmeraldas, km 102, Esmeraldas-La Tola, a lado de la carretera, en pantano en un sabana grande, 27 Jul 1984, *Dodson et al.* 14564 (MO). **PARAGUAY**: no date, *Reugger s.n.* (ZT). **TOBAGO**: Buccoo Bay, 20 Apr 1939, *Elmore 510* (MICH). **TRINIDAD**: ca. 2-3 mi E of Trinidad along the Beetham Hwy, low lying sedge marshes, 04 Aug 1970, *Davidse 2546* (MO, NY). **VENEZUELA**. **Sucre**: Laguna La Bodega, inmediatamente al Este de Santa Fe, 17 Sep 1973, *Steyermark et al.* 108552 (MO).

**AFRICA. ANGOLA.** Moxico: Ikula hot springs by R. Zambezi, plentiful in rock pools in 1–1.5 ft of water, tufted and stoloniferous perennial; lower sheaths pale brown; upper and stem green, triangular, glumes green, edged red-brown, turning pale brown, 17 Jan 1938, *Milne-Redhead 4195* (K). **LIBERIA:** Crew Town, Monrovia, in water, 27 Jun 1909, *Massey 82* (NY). **SENEGAL:** Lyndiane, 30 Sep 1956, *Jacques-Georges 12460* (MO); Ziguinchor, km 54–57 Cap Skiring-Bignona, vicinity of Nyassia, moist area in mangrove-area, 11 Sep 1994, *Laegaard et al. 16891* (K, US); Basse-Casamance, Fegroum, 08 Nov 1990, *Berghen 9301* (MO); 10 Apr 1946, *Roberty 6209* (Z). **SIERRA LEONE:** emplodered (sic) swamp, Rokupr, 03 Jul 1947, *Jordan 42* (K). **TANZANIA. Pemba:** Makongwe Is, in shallow water on the edge of a pond, leaves and stems (hand drawn triangle symbol) and flower spikes sessile at the apex of the stem, 16 Dec 1930, *Greenway 2730* (K). **TOGO:** Agwegan, entre route et lagune, depression sale, savane herbense inonde eau sale 9 gr Natt/litre, 26 Jun 1985, *Schafer 8629* (MO, US).

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